

N. 1

12/-



The
Pencil of Nature
by
H. Fox Talbot
F.R.S.

LONGMAN, BROWN, GREEN AND LONGMANS.

LONDON, 1844.

B. 17

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29 SET. 1979

The Pencil of Nature,

BY

H. FOX TALBOT, Esq., F.R.S.

&c. &c. &c.



JUVAT IRE JUGIS QUA NULLA PRIORUM
CASTALIAM MOLLI DEVERTITUR ORBITA CLIVO.

LONDON:

LONGMAN, BROWN, GREEN, & LONGMANS,
PATERNOSTER ROW.

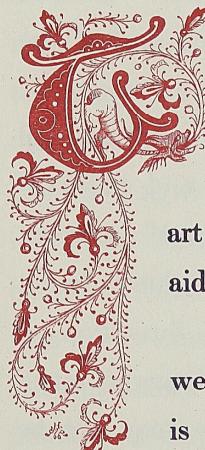
1844.



*A sua Altezza Imperiale e Reale
Leopoldo IIº
Gran Duca di Toscana
omaggio dell' Autore*

B: 17.4. 856

Introductory Remarks.



THE little work now presented to the Public is the first attempt to publish a series of plates or pictures wholly executed by the new art of Photogenic Drawing, without any aid whatever from the artist's pencil.

The term "Photography" is now so well known, that an explanation of it is perhaps superfluous; yet, as some persons may still be unacquainted with the art, even by name, its discovery being still of

very recent date, a few words may be looked for of general explanation.

It may suffice, then, to say, that the plates of this work have been obtained by the mere action of Light upon sensitive paper. They have been formed or depicted by optical and chemical means alone, and without the aid of any one acquainted with the art of drawing. It is needless, therefore, to say that they differ in all respects, and as widely as possible, in their origin, from plates of the ordinary kind, which owe their existence to the united skill of the Artist and the Engraver.

They are impressed by Nature's hand ; and what they want as yet of delicacy and finish of execution arises chiefly from our want of sufficient knowledge of her laws. When we have learnt more, by experience, respecting the formation of such pictures, they will doubtless be brought much nearer to perfection ; and though we may not be able to conjecture with any certainty what rank they may hereafter attain to as pictorial productions, they

will surely find their own sphere of utility, both for completeness of detail and correctness of perspective.

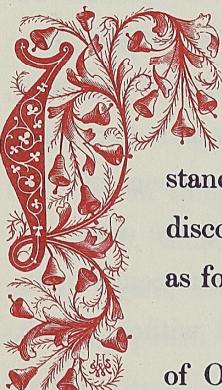
The Author of the present work having been so fortunate as to discover, about ten years ago, the principles and practice of Photogenic Drawing, is desirous that the first specimen of an Art, likely in all probability to be much employed in future, should be published in the country where it was first discovered. And he makes no doubt that his countrymen will deem such an intention sufficiently laudable to induce them to excuse the imperfections necessarily incident to a first attempt to exhibit an Art of so great singularity, which employs processes entirely new, and having no analogy to any thing in use before. That such imperfections will occur in a first essay, must indeed be expected. At present the Art can hardly be said to have advanced beyond its infancy—at any rate, it is yet in a very early stage—and its practice is often impeded by doubts and difficulties, which, with increasing knowledge, will

diminish and disappear. Its progress will be more rapid when more minds are devoted to its improvement, and when more of skilful manual assistance is employed in the manipulation of its delicate processes ; the paucity of which skilled assistance at the present moment the Author finds one of the chief difficulties in his way.

Brief Historical Sketch

of the

Invention of the Art.



T may be proper to preface these specimens of a new Art by a brief account of the circumstances which preceded and led to the discovery of it. And these were nearly as follows.

One of the first days of the month of October 1833, I was amusing myself on the lovely shores of the Lake of Como, in Italy, taking sketches with Wollaston's Camera Lucida,

or rather I should say, attempting to take them : but with the smallest possible amount of success. For when the eye was removed from the prism—in which all looked beautiful—I found that the faithless pencil had only left traces on the paper melancholy to behold.

After various fruitless attempts, I laid aside the instrument and came to the conclusion, that its use required a previous knowledge of drawing, which unfortunately I did not possess.

I then thought of trying again a method which I had tried many years before. This method was, to take a Camera Obscura, and to throw the image of the objects on a piece of transparent tracing paper laid on a pane of glass in the focus of the instrument. On this paper the objects are distinctly seen, and can be traced on it with a pencil with some degree of accuracy, though not without much time and trouble.

I had tried this simple method during former visits to Italy in 1823 and 1824, but found it in

practice somewhat difficult to manage, because the pressure of the hand and pencil upon the paper tends to shake and displace the instrument (insecurely fixed, in all probability, while taking a hasty sketch by a roadside, or out of an inn window); and if the instrument is once deranged, it is most difficult to get it back again, so as to point truly in its former direction.

Besides which, there is another objection, namely, that it baffles the skill and patience of the amateur to trace all the minute details visible on the paper ; so that, in fact, he carries away with him little beyond a mere souvenir of the scene—which, however, certainly has its value when looked back to, in long after years.

Such, then, was the method which I proposed to try again, and to endeavour, as before, to trace with my pencil the outlines of the scenery depicted on the paper. And this led me to reflect on the inimitable beauty of the pictures of nature's painting which the glass lens of the Camera throws upon

the paper in its focus—fairy pictures, creations of a moment, and destined as rapidly to fade away.

It was during these thoughts that the idea occurred to me how charming it would be if it were possible to cause these natural images to imprint themselves durably, and remain fixed upon the paper!

And why should it not be possible? I asked myself.

The picture, divested of the ideas which accompany it, and considered only in its ultimate nature, is but a succession or variety of stronger lights thrown upon one part of the paper, and of deeper shadows on another. Now Light, where it exists, can exert an action, and, in certain circumstances, does exert one sufficient to cause changes in material bodies. Suppose, then, such an action could be exerted on the paper; and suppose the paper could be visibly changed by it. In that case surely some effect must result having a general resemblance to the cause which produced it: so that the variegated

scene of light and shade might leave its image or impression behind, stronger or weaker on different parts of the paper according to the strength or weakness of the light which had acted there.

Such was the idea that came into my mind. Whether it had ever occurred to me before amid floating philosophic visions, I know not, though I rather think it must have done so, because on this occasion it struck me so forcibly. I was then a wanderer in classic Italy, and, of course, unable to commence an inquiry of so much difficulty: but, lest the thought should again escape me between that time and my return to England, I made a careful note of it in writing, and also of such experiments as I thought would be most likely to realize it, if it were possible.

And since, according to chemical writers, the nitrate of silver is a substance peculiarly sensitive to the action of light, I resolved to make a trial of it, in the first instance, whenever occasion permitted on my return to England.

But although I knew the fact from chemical books, that nitrate of silver was changed or decomposed by Light, still I had never seen the experiment tried, and therefore I had no idea whether the action was a rapid or a slow one; a point, however, of the utmost importance, since, if it were a slow one, my theory might prove but a philosophic dream.

Such were, as nearly as I can now remember, the reflections which led me to the invention of this theory, and which first impelled me to explore a path so deeply hidden among nature's secrets. And the numerous researches which were afterwards made—whatever success may be thought to have attended them—cannot, I think, admit of a comparison with the value of the first and original idea.

In January 1834, I returned to England from my continental tour, and soon afterwards I determined to put my theories and speculations to the test of experiment, and see whether they had any real foundation.

Accordingly I began by procuring a solution of

nitrate of silver, and with a brush spread some of it upon a sheet of paper, which was afterwards dried. When this paper was exposed to the sunshine, I was disappointed to find that the effect was very slowly produced in comparison with what I had anticipated.

I then tried the chloride of silver, freshly precipitated and spread upon paper while moist. This was found no better than the other, turning slowly to a darkish violet colour when exposed to the sun.

Instead of taking the chloride already formed, and spreading it upon paper, I then proceeded in the following way. The paper was first washed with a strong solution of salt, and when this was dry, it was washed again with nitrate of silver. Of course, chloride of silver was thus formed in the paper, but the result of this experiment was almost the same as before, the chloride not being apparently rendered more sensitive by being formed in this way.

Similar experiments were repeated at various times, in hopes of a better result, frequently chang-

ing the proportions employed, and sometimes using the nitrate of silver before the salt, &c. &c.

In the course of these experiments, which were often rapidly performed, it sometimes happened that the brush did not pass over the whole of the paper, and of course this produced irregularity in the results. On some occasions certain portions of the paper were observed to blacken in the sunshine much more rapidly than the rest. These more sensitive portions were generally situated near the edges or confines of the part that had been washed over with the brush.

After much consideration as to the cause of this appearance, I conjectured that these bordering portions might have absorbed a lesser quantity of salt, and that, for some reason or other, this had made them more sensitive to the light. This idea was easily put to the test of experiment. A sheet of paper was moistened with a much weaker solution of salt than usual, and when dry, it was washed with nitrate of silver. This paper, when exposed to the

sunshine, immediately manifested a far greater degree of sensitiveness than I had witnessed before, the whole of its surface turning black uniformly and rapidly: establishing at once and beyond all question the important fact, that a lesser quantity of salt produced a greater effect. And, as this circumstance was unexpected, it afforded a simple explanation of the cause why previous inquirers had missed this important result, in their experiments on chloride of silver, namely, because they had always operated with wrong proportions of salt and silver, using plenty of salt in order to produce a perfect chloride, whereas what was required (it was now manifest) was, to have a deficiency of salt, in order to produce an imperfect chloride, or (perhaps it should be called) a *subchloride* of silver.

So far was a free use or abundance of salt from promoting the action of light on the paper, that on the contrary it greatly weakened and almost destroyed it: so much so, that a bath of salt water was used subsequently as a fixing process to pre-

vent the further action of light upon sensitive paper.

This process, of the formation of a subchloride by the use of a very weak solution of salt, having been discovered in the spring of 1834, no difficulty was found in obtaining distinct and very pleasing images of such things as leaves, lace, and other flat objects of complicated forms and outlines, by exposing them to the light of the sun.

The paper being well dried, the leaves, &c. were spread upon it, and covered with a glass pressed down tightly, and then placed in the sunshine; and when the paper grew dark, the whole was carried into the shade, and the objects being removed from off the paper, were found to have left their images very perfectly and beautifully impressed or delineated upon it.

But when the sensitive paper was placed in the focus of a Camera Obscura and directed to any object, as a building for instance, during a moderate space of time, as an hour or two, the effect produced

upon the paper was not strong enough to exhibit such a satisfactory picture of the building as had been hoped for. The outline of the roof and of the chimneys, &c. against the sky was marked enough; but the details of the architecture were feeble, and the parts in shade were left either blank or nearly so. The sensitiveness of the paper to light, considerable as it seemed in some respects, was therefore, as yet, evidently insufficient for the purpose of obtaining pictures with the Camera Obscura; and the course of experiments had to be again renewed in hopes of attaining to some more important result.

The next interval of sufficient leisure which I found for the prosecution of this inquiry, was during a residence at Geneva in the autumn of 1834. The experiments of the previous spring were then repeated and varied in many ways; and having been struck with a remark of Sir H. Davy's which I had casually met with—that the *iodide* of silver was more sensitive to light than the *chloride*, I resolved to

make trial of the iodide. Great was my surprise on making the experiment to find just the contrary of the fact alleged, and to see that the iodide was not only less sensitive than the chloride, but that it was not sensitive at all to light; indeed that it was absolutely insensible to the strongest sunshine: retaining its original tint (a pale straw colour) for any length of time unaltered in the sun. This fact showed me how little dependance was to be placed on the statements of chemical writers in regard to this particular subject, and how necessary it was to trust to nothing but actual experiment: for although there could be no doubt that Davy had observed what he described under certain circumstances—yet it was clear also, that what he had observed was some exception to the rule, and not the rule itself. In fact, further inquiry showed me that Davy must have observed a sort of subiodide in which the iodine was deficient as compared with the silver: for, as in the case of the chloride and subchloride the former is much less sensitive, so between the iodide and subiodide

there is a similar contrast, but it is a much more marked and complete one.

However, the fact now discovered, proved of immediate utility; for, the iodide of silver being found to be insensible to light, and the chloride being easily converted into the iodide by immersion in iodide of potassium, it followed that a picture made with the chloride could be *fixed* by dipping it into a bath of the alkaline iodide.

This process of fixation was a simple one, and it was sometimes very successful. The disadvantages to which it was liable did not manifest themselves until a later period, and arose from a new and unexpected cause, namely, that when a picture is so treated, although it is permanently secured against the *darkening* effect of the solar rays, yet it is exposed to a contrary or *whitening* effect from them; so that after the lapse of some days the dark parts of the picture begin to fade, and gradually the whole picture becomes obliterated, and is reduced to the appearance of a uniform pale yellow sheet of paper.

A good many pictures, no doubt, escape this fate, but as they all seem liable to it, the fixing process by iodine must be considered as not sufficiently certain to be retained in use as a photographic process, except when employed with several careful precautions which it would be too long to speak of in this place.

During the brilliant summer of 1835 in England I made new attempts to obtain pictures of buildings with the Camera Obscura; and having devised a process which gave additional sensibility to the paper, viz. by giving it repeated alternate washes of salt and silver, and using it in a moist state, I succeeded in reducing the time necessary for obtaining an image with the Camera Obscura on a bright day to ten minutes. But these pictures, though very pretty, were very small, being quite miniatures. Some were obtained of a larger size, but they required much patience, nor did they seem so perfect as the smaller ones, for it was difficult to keep the instrument steady for a great length of time pointing at the same

object, and the paper being used moist was often acted on irregularly.

During the three following years not much was added to previous knowledge. Want of sufficient leisure for experiments was a great obstacle and hindrance, and I almost resolved to publish some account of the Art in the imperfect state in which it then was.

However curious the results which I had met with, yet I felt convinced that much more important things must remain behind, and that the clue was still wanting to this labyrinth of facts. But as there seemed no immediate prospect of further success, I thought of drawing up a short account of what had been done, and presenting it to the Royal Society.

However, at the close of the year 1838, I discovered a remarkable fact of quite a new kind. Having spread a piece of silver leaf on a pane of glass, and thrown a particle of iodine upon it, I observed that coloured rings formed themselves around the central particle, especially if the glass was slightly

warmed. The coloured rings I had no difficulty in attributing to the formation of infinitely thin layers or strata of iodide of silver; but a most unexpected phenomenon occurred when the silver plate was brought into the light by placing it near a window. For then the coloured rings shortly began to change their colours, and assumed other and quite unusual tints, such as are never seen in the "*colours of thin plates.*" For instance, the part of the silver plate which at first shone with a pale yellow colour, was changed to a dark olive green when brought into the daylight. This change was not very rapid: it was much less rapid than the changes of some of the sensitive papers which I had been in the habit of employing, and therefore, after having admired the beauty of this new phenomenon, I laid the specimens by, for a time, to see whether they would preserve the same appearance, or would undergo any further alteration.

Such was the progress which I had made in this inquiry at the close of the year 1838, when an

event occurred in the scientific world, which in some degree frustrated the hope with which I had pursued, during nearly five years, this long and complicated, but interesting series of experiments—the hope, namely, of being the first to announce to the world the existence of the New Art—which has been since named Photography.

I allude, of course, to the publication in the month of January 1839, of the great discovery of M. Daguerre, of the photographic process which he has called the Daguerreotype. I need not speak of the sensation created in all parts of the world by the first announcement of this splendid discovery, or rather, of the fact of its having been made, (for the actual method made use of was kept secret for many months longer). This great and sudden celebrity was due to two causes: first, to the beauty of the discovery itself: secondly, to the zeal and enthusiasm of Arago, whose eloquence, animated by private friendship, delighted in extolling the inventor of this new art, sometimes to the assembled science of the

French Academy, at other times to the less scientific judgment, but not less eager patriotism, of the Chamber of Deputies.

But, having brought this brief notice of the early days of the Photographic Art to the important epoch of the announcement of the Daguerreotype, I shall defer the subsequent history of the Art to a future number of this work.

Some time previously to the period of which I have now been speaking, I met with an account of some researches on the action of Light, by Wedgwood and Sir H. Davy, which, until then, I had never heard of. Their short memoir on this subject was published in 1802 in the first volume of the Journal of the Royal Institution. It is curious and interesting, and certainly establishes their claim as the first inventors of the Photographic Art, though the actual progress they made in it was small. They succeeded, indeed, in obtaining impressions from

solar light of flat objects laid upon a sheet of prepared paper, but they say that they found it impossible to fix or preserve those pictures: all their numerous attempts to do so having failed.

And with respect to the principal branch of the Art, viz. the taking pictures of distant objects with a Camera Obscura, they attempted to do so, but obtained no result at all, however long the experiment lasted. While therefore due praise should be awarded to them for making the attempt, they have no claim to the actual discovery of any process by which such a picture can really be obtained.

It is remarkable that the failure in this respect appeared so complete, that the subject was soon after abandoned both by themselves and others, and as far as we can find, it was never resumed again. The thing fell into entire oblivion for more than thirty years: and therefore, though the Daguerreotype was not so entirely new a conception as M. Daguerre and the French Institute imagined, and though my own labours had been still more directly anticipated by

Wedgwood, yet the improvements were so great in all respects, that I think the year 1839 may fairly be considered as the real date of the birth of the Photographic Art, that is to say, its first public disclosure to the world.

There is a point to which I wish to advert, which respects the execution of the following specimens. As far as respects the design, the copies are almost facsimiles of each other, but there is some variety in the tint which they present. This arises from a twofold cause. In the first place, each picture is separately formed by the light of the sun, and in our climate the strength of the sun's rays is exceedingly variable even in serene weather. When clouds intervene, a longer time is of course allowed for the impression of a picture, but it is not possible to reduce this to a matter of strict and accurate calculation.

The other cause is the variable quality of the

paper employed, even when furnished by the same manufacturers—some differences in the fabrication and in the *sizing* of the paper, known only to themselves, and perhaps secrets of the trade, have a considerable influence on the tone of colour which the picture ultimately assumes.

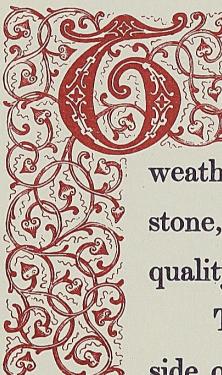
These tints, however, might undoubtedly be brought nearer to uniformity, if any great advantage appeared likely to result: but, several persons of taste having been consulted on the point, viz. which tint on the whole deserved a preference, it was found that their opinions offered nothing approaching to unanimity, and therefore, as the process presents us spontaneously with a variety of shades of colour, it was thought best to admit whichever appeared pleasing to the eye, without aiming at an uniformity which is hardly attainable. And with these brief observations I commend the pictures to the indulgence of the Gentle Reader.

and has lost in some measure its original
vibrant teeth and are now
of a dead hue, the loss of which
deprives the building of its
original beauty.

Queen's College

PLATE I.

PART OF QUEEN'S COLLEGE, OXFORD.



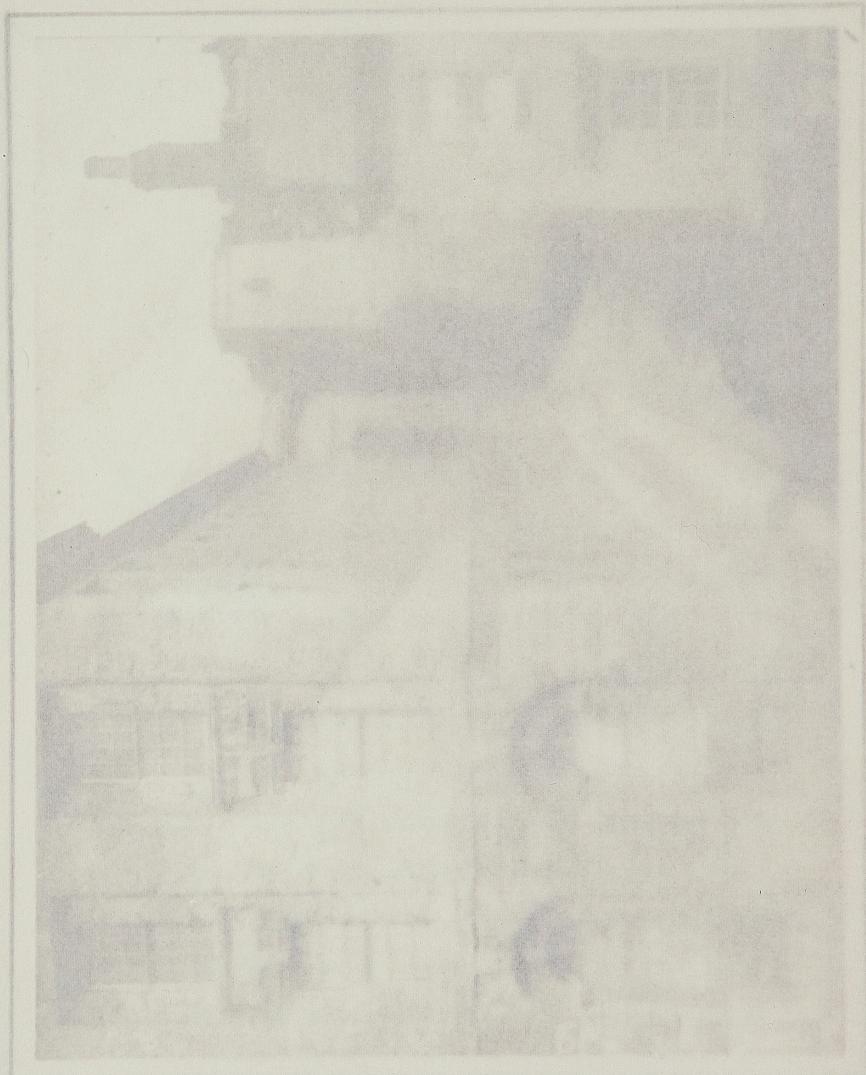
HIS building presents on its surface the most evident marks of the injuries of time and weather, in the abraded state of the stone, which probably was of a bad quality originally.

The view is taken from the other side of the High Street—looking North.

The time is morning.

In the distance is seen at the end of a narrow street the Church of St. Peter's in the East, said to

be the most ancient church in Oxford, and built during the Saxon era. This street, shortly after passing the church, turns to the left, and leads to New College.



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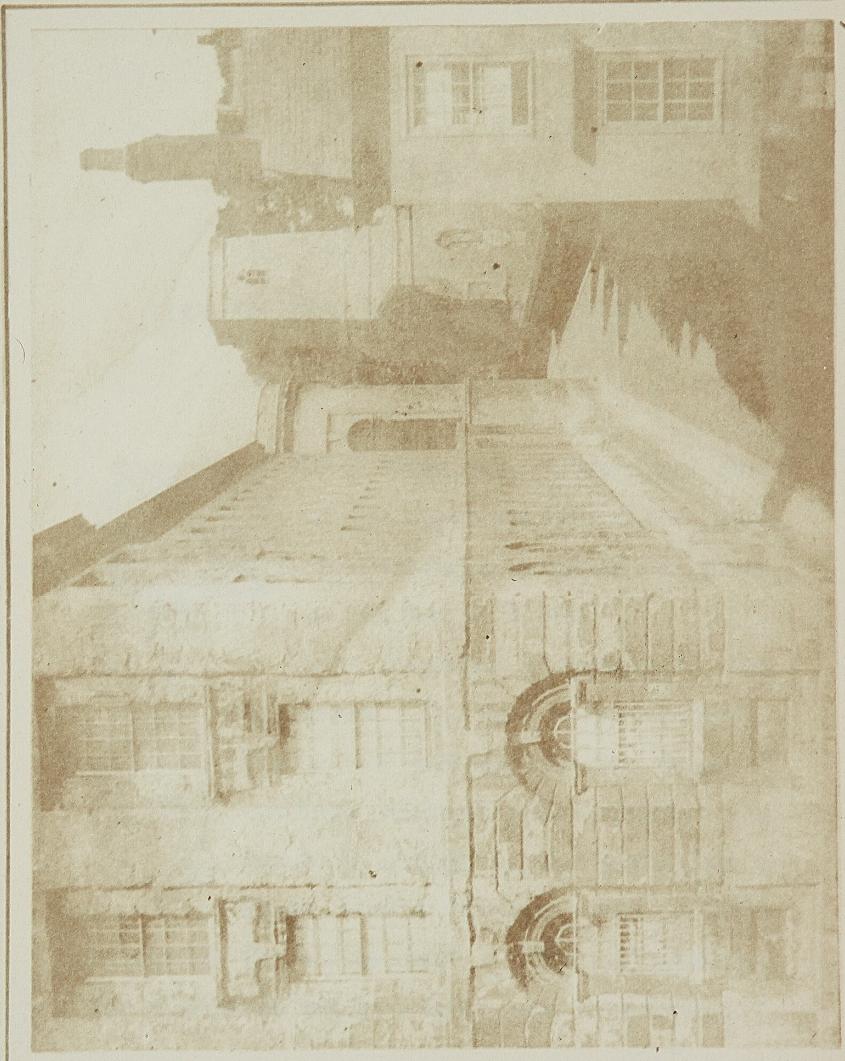
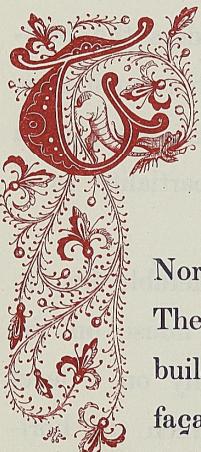


PLATE II.

VIEW OF THE BOULEVARDS AT PARIS.



HIS view was taken from one of the upper windows of the Hotel de Douvres, situated at the corner of the Rue de la Paix.

The spectator is looking to the North-east. The time is the afternoon. The sun is just quitting the range of buildings adorned with columns: its façade is already in the shade, but a single shutter standing open projects far enough forward to catch a gleam of sunshine. The weather is hot and dusty, and they have just

been watering the road, which has produced two broad bands of shade upon it, which unite in the foreground, because, the road being partially under repair (as is seen from the two wheelbarrows, &c. &c.), the watering machines have been compelled to cross to the other side.

By the roadside a row of *cittadines* and cabriolets are waiting, and a single carriage stands in the distance a long way to the right.

A whole forest of chimneys borders the horizon: for, the instrument chronicles whatever it sees, and certainly would delineate a chimney-pot or a chimney-sweeper with the same impartiality as it would the Apollo of Belvedere.

The view is taken from a considerable height, as appears easily by observing the house on the right hand; the eye being necessarily on a level with that part of the building on which the horizontal lines or courses of stone appear parallel to the margin of the picture.





LIBRERIA NAZIONALE
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PLATE III.

ARTICLES OF CHINA.



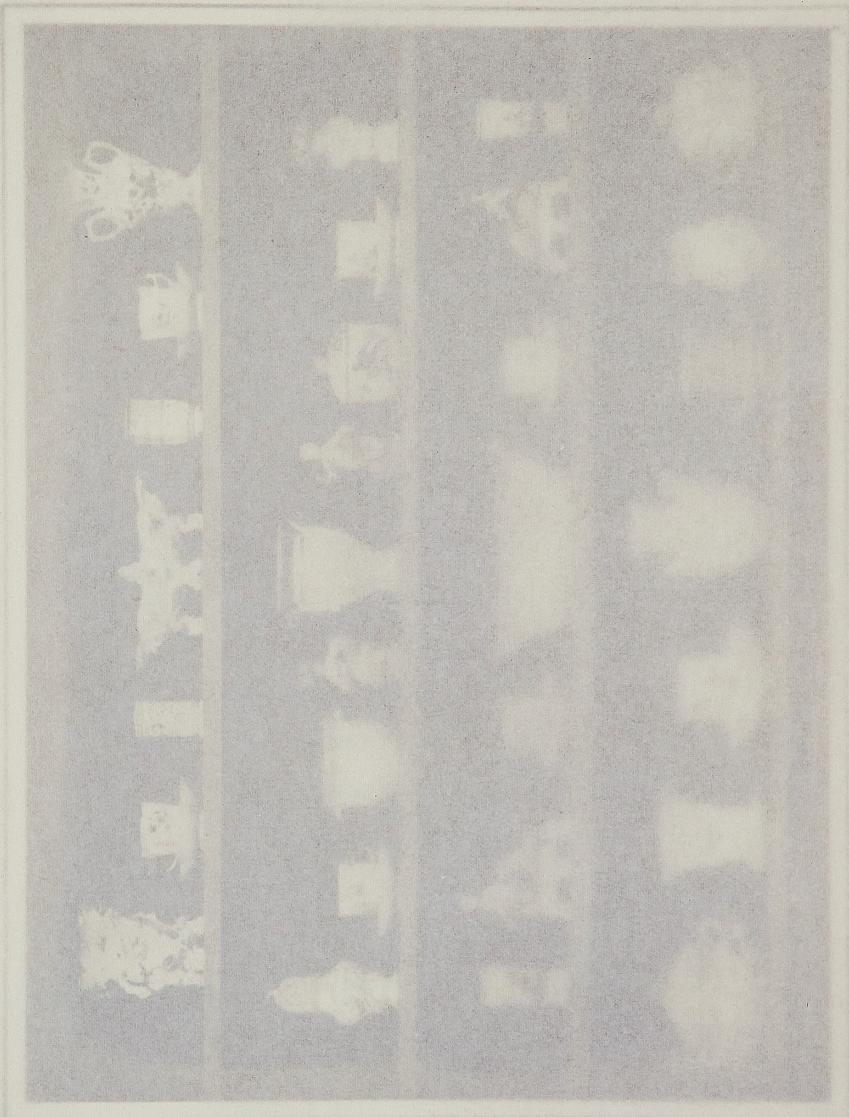
ROM the specimen here given it is sufficiently manifest, that the whole cabinet of a Virtuoso and collector of old China might be depicted on paper in little more time than it would take him to make a written inventory describing it in the usual way.

The more strange and fantastic the forms of his old teapots, the more advantage in having their pictures given instead of their descriptions.

And should a thief afterwards purloin the treasures—if the mute testimony of the picture were to be produced against him in court—it would certainly be evidence of a novel kind; but what the judge and jury might say to it, is a matter which

I leave to the speculation of those who possess legal acumen.

The articles represented on this plate are numerous: but, however numerous the objects—however complicated the arrangement—the Camera depicts them all at once. It may be said to make a picture of whatever *it sees*. The object glass is the *eye* of the instrument—the sensitive paper may be compared to the *retina*. And, the eye should not have too large a *pupil*: that is to say, the glass should be diminished by placing a screen or diaphragm before it, having a small circular hole, through which alone the rays of light may pass. When the eye of the instrument is made to look at the objects through this contracted aperture, the resulting image is much more sharp and correct. But it takes a longer time to impress itself upon the paper, because, in proportion as the aperture is contracted, fewer rays enter the instrument from the surrounding objects, and consequently fewer fall upon each part of the paper.



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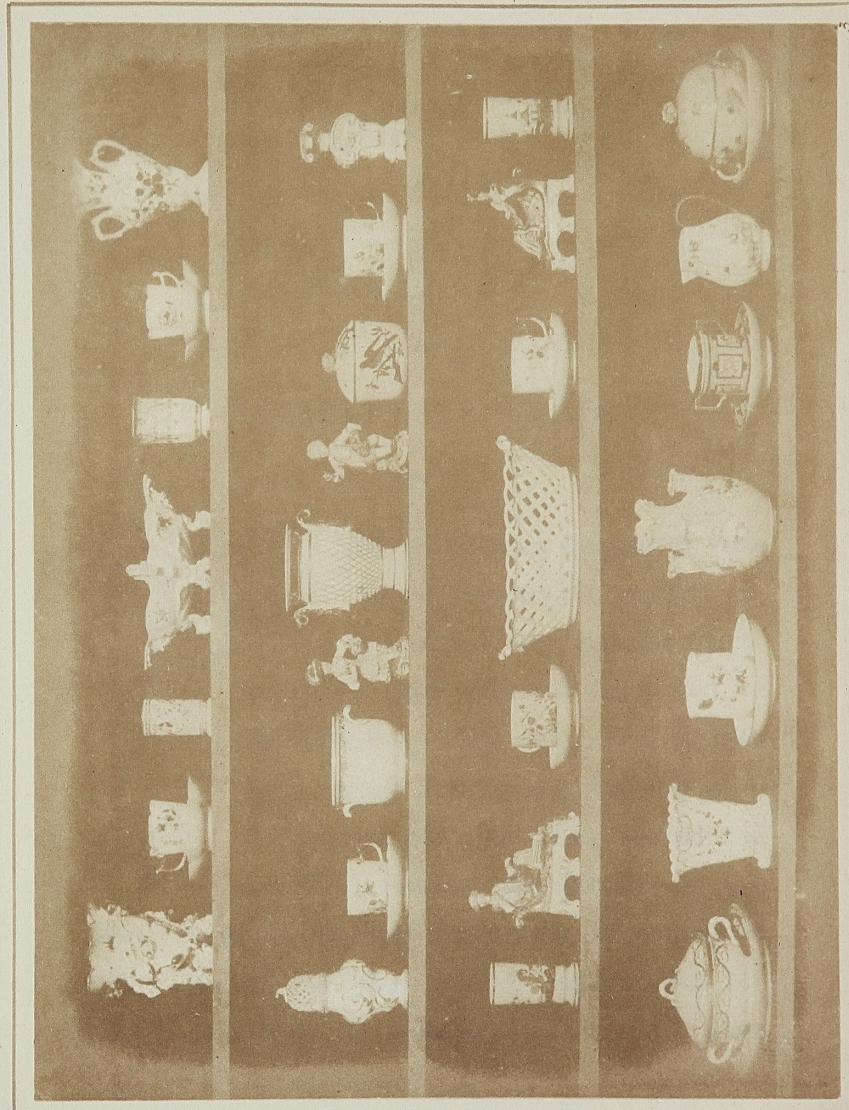
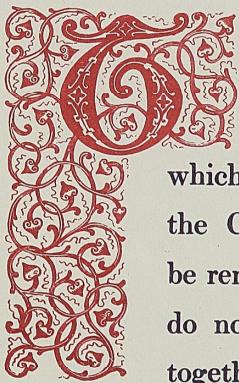


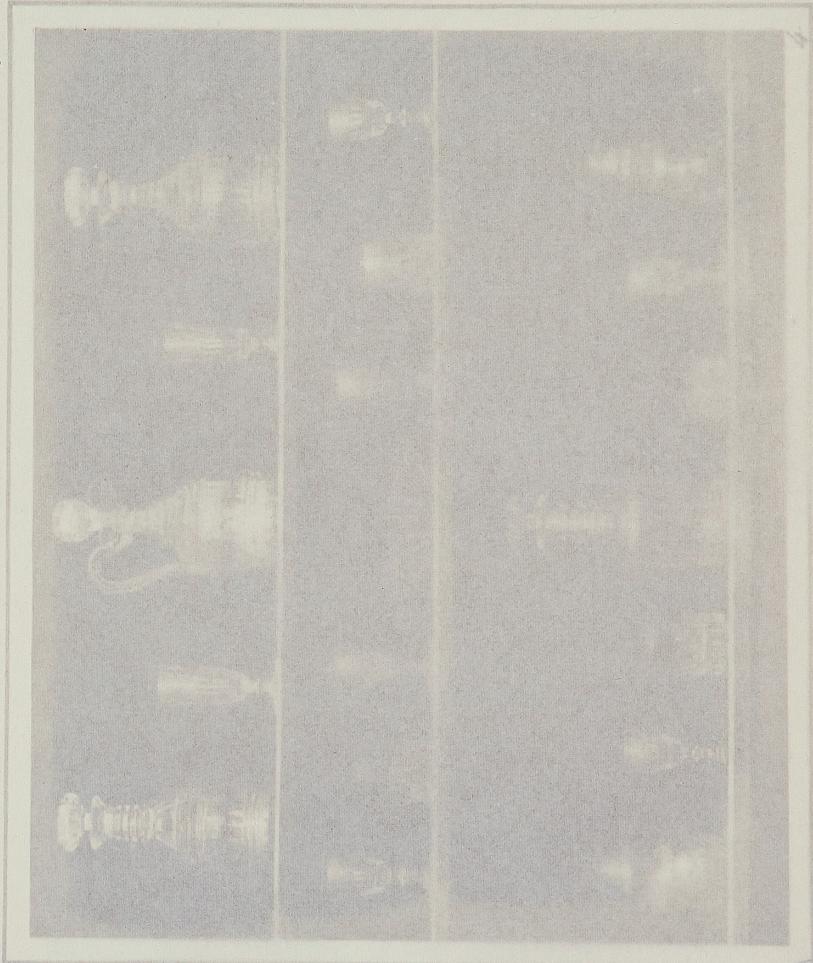
PLATE IV.

ARTICLES OF GLASS.



HE photogenic images of glass articles impress the sensitive paper with a very peculiar touch, which is quite different from that of the China in Plate III. And it may be remarked that white china and glass do not succeed well when represented together, because the picture of the china, from its superior brightness, is completed before that of the glass is well begun. But coloured china may be introduced along with glass

in the same picture, provided the colour is not a pure blue: since blue objects affect the sensitive paper almost as rapidly as white ones do. On the contrary, green rays act very feebly—an inconvenient circumstance, whenever green trees are to be represented in the same picture with buildings of a light hue, or with any other light coloured objects.



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PLATE V.

BUST OF PATROCLUS.

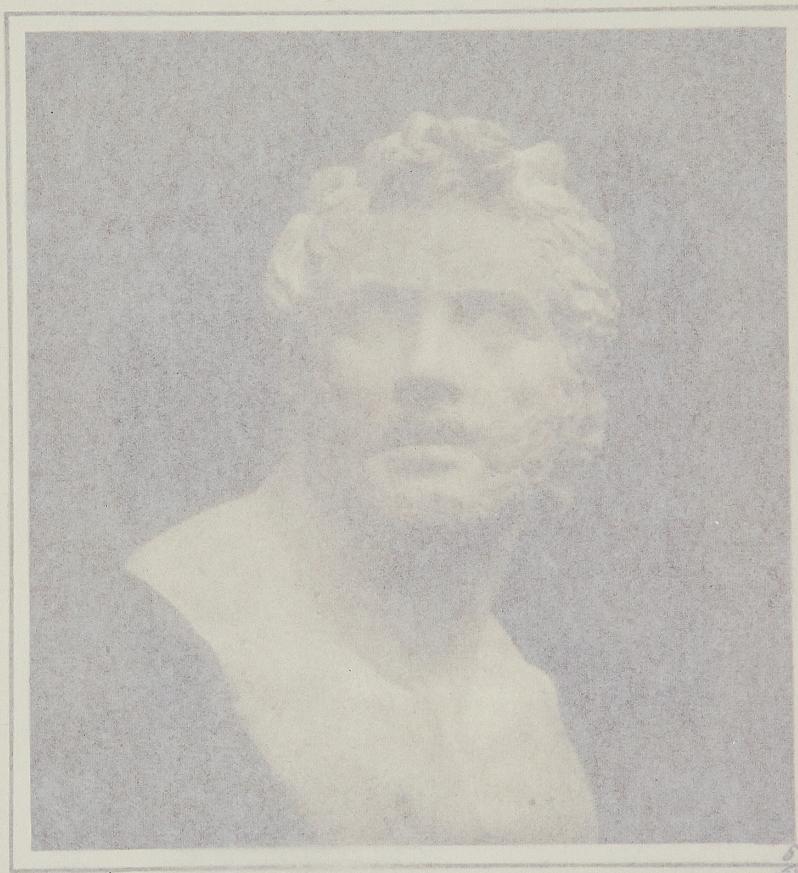


STATUES, busts, and other specimens of sculpture, are generally well represented by the Photographic Art; and also very rapidly, in consequence of their whiteness.

These delineations are susceptible of an almost unlimited variety: since in the first place, a statue may be placed in any position with regard to the sun, either directly opposite to it, or at any angle: the directness or obliquity of the illumination causing

of course an immense difference in the effect. And when a choice has been made of the direction in which the sun's rays shall fall, the statue may be then turned round on its pedestal, which produces a second set of variations no less considerable than the first. And when to this is added the change of size which is produced in the image by bringing the Camera Obscura nearer to the statue or removing it further off, it becomes evident how very great a number of different effects may be obtained from a single specimen of sculpture.

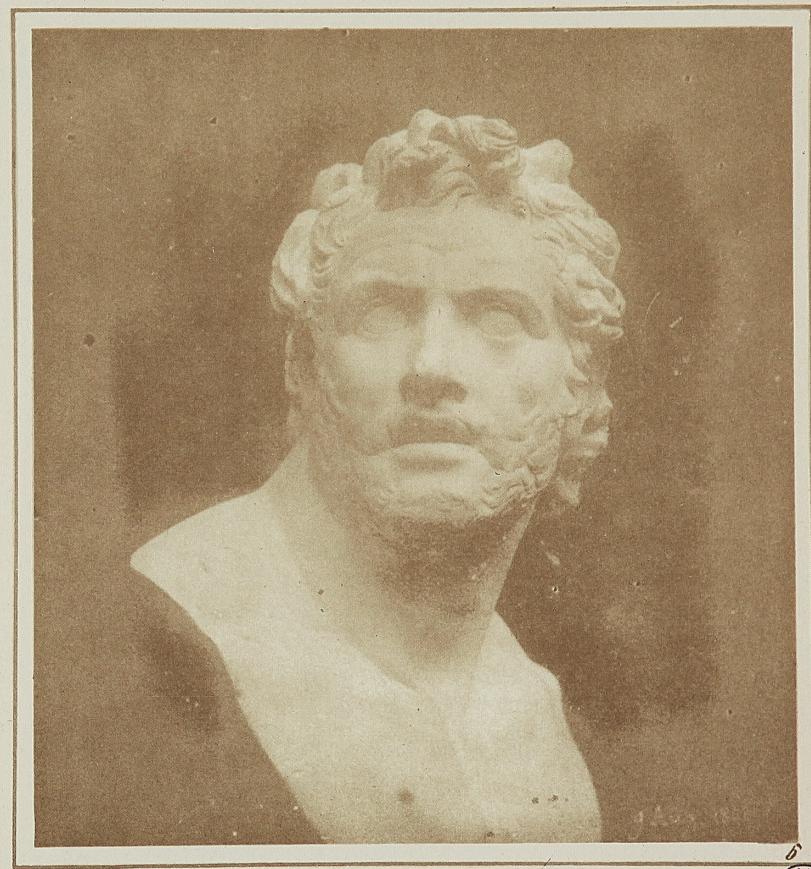
With regard to many statues, however, a better effect is obtained by delineating them in cloudy weather than in sunshine. For, the sunshine causes such strong shadows as sometimes to confuse the subject. To prevent this, it is a good plan to hold a white cloth on one side of the statue at a little distance to reflect back the sun's rays and cause a faint illumination of the parts which would otherwise be lost in shadow.



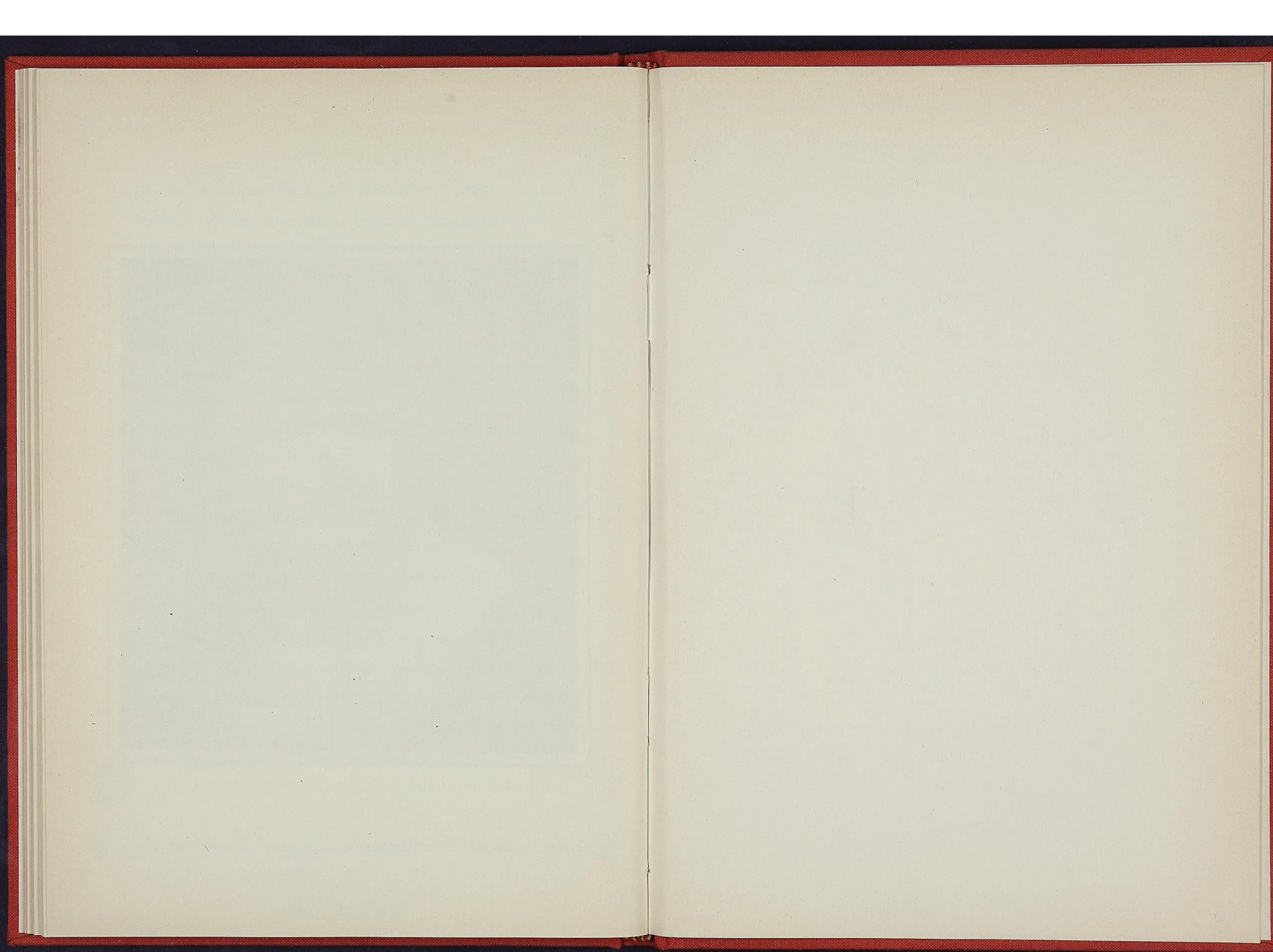
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of course an immense difference in the effect. And when a choice has been made of the direction in which the sun's rays shall fall, the statue may be then turned round on its pedestal, which produces a second set of variations no less considerable than the first. And when to this is added the change of size which is produced in the image by bringing the Camera Obscura nearer to the statue or removing it further off, it becomes evident how very great a number of different effects may be obtained from a single specimen of sculpture.

With regard to many statues, however, a better effect is obtained by delineating them in cloudy weather than in sunshine. For, the sunshine causes such strong shadows as sometimes to confuse the subject. To prevent this, it is a good plan to hold a white cloth on one side of the statue at a little distance to reflect back the sun's rays and cause a faint illumination of the parts which would otherwise be lost in shadow.



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